occurred on the coast of Oregon, where the precipitation was more than three inches less than the average amount for November. At Cumberland, Md., Newburyport, Mass., Moorestown and South Orange, N. J., and Wellsborough, Pa., the precipitation for the current month was the heaviest reported for November. The more notable features of the precipitation for the period January 1 to November 30, 1889, inclusive, are: the great excess in the middle Atlantic states, where about one-third more than the usual amount of rain fell, and the marked deficiencies in the extreme northwest and middle plateau region, where the precipitation was about two-thirds of the usual amount for that period. The greatest depth of snowfall reported was sixty-one inches at Summit, Cal. Forty-seven inches were reported at Breckenridge, Colo.; twenty-nine inches at Roswell, N. Mex.; twenty-eight inches at Cisco, Cal.; twenty-two inches at Green Bay, Wis.; twenty-two inches at Blue Knob, Pa.; and twenty-one inches at Alpena, Mich. On the immediate Atlantic coast snow fell as far south as extreme southern New Jersey; in the east Gulf states, to northern Georgia; in the west Gulf states, to central Texas; in the plateau region, to extreme southern New Mexico and southeastern Arizona; and in northeastern California, Oregon, and eastern Washington.

Damaging floods, resulting from heavy rain, occurred in various parts of Pennsylvania, New Jersey, and southern New York from the 17th to 21st, and in New England, New Jersey, and Delaware on the 27th and 28th. Navigation was interrupted or suspended by ice on the Mississippi River above Keokuk, Iowa, and on the middle and upper Missouri River. Well-defined auroral displays were noted in North Dakota on the 1st and 26th; in Minnesota and Michigan on the 17th; and in Vermont and Maine on the 17th and 26th. Brilliant meteors were reported at Elyria, N. Y., on the 2d; at Alpena, Mich., on the 10th; at Little Rock, Ark., on the 14th; at Fort Sully, S. Dak., on the 17th; at Yates Centre, Kans., on the 23d; at Berkeley, Cal., on the 25th; and at Palestine, Tex., 27th.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for November, 1889, as determined from observations taken daily at 8 a. m. and 8. p. m. (75th meridian time), is shown on chart ii by isobars. The difference between the mean pressure for November obtained from observations taken twice daily at the hours named and that determined from hourly observations, varied at the stations named below, as follows: At Washington, D. C., Philadelphia, Pa., New York, N. Y., Boston, Mass., Saint Louis, Mo., and Chicago, Ill., the mean of the 8 a. m. and 8 p. m. observations was higher by .017, .009, .010, .013, .006, and .007, respectively, than the true mean pressure, while at Denver, Colo., the mean of the observations taken at these hours corresponded with the mean obtained from hourly observations.

The mean pressure for November, 1889, was highest within an area extending from Colorado northwestward to southern Idaho, where the values rose above 30.25, the highest mean reading, 30.33, being noted at Montrose, Colo. Over the Rocky Mountain and plateau regions, and over the eastern portion of the country, south of the Ohio Valley, the mean pressure was generally above 30.10, and in the Gulf and south Atlantic states rose to 30.15. The mean pressure was lowest in the lower Saint Lawrence valley and in north-central Ontario, where the readings were below 30.00. The mean pressure was below 30.05 on the extreme north Pacific coast, in the British Possessions north of western Montana, and north of a line traced from the central New England coast westward over the lower lake region, and thence northwestward over northern Michigan and Lake Superior.

A comparison of the pressure chart for November, 1889, with that of the preceding month shows that a general increase in pressure occurred, except in northern New England, northern New York, the upper and lower lake regions, the Ohio, upper Mississippi, and Red River of the North valleys, and in Canada east of the one-hundredth meridian. The most marked increase in pressure occurred within an area extending from Colorado northwestward to Idaho, where the mean readings were more than .20 higher than for the preceding month, from which region the increase became gradually less marked northward, and towards the Gulf, Atlantic, and Pacific coasts. Over the northern portion of the upper lake region the decrease in pressure was more than .10, whence it became gradually less marked to a line indicating no change in pressure traced from western Nova Scotia westward to central New York, thence southwestward over the Ohio Valley, and thence northwestward to Manitoba. For October, 1889, the area of highest mean pressure occupied the upper Mississippi and Missouri valleys and the upper lake region, with included values above 30.15, and a well-defined area of low pressure embraced a part of the southern plateau region. For the current month the area of highest pressure appeared over parts of the middle plateau region and the middle-eastern slope of the Rocky Mountains, with mean readings about .10 higher than the highest means noted for the preceding month, and no area of low pressure appeared within the region of observation.

The mean pressure for November, 1889, was generally above the normal from the Mississippi River and the upper lake region to the Pacific coast, in New England, and along the immediate Atlantic coast. The mean pressure was below the normal in the Saint Lawrence Valley, and thence southwestward to the east Gulf coast. The departures above the normal pressure were greatest over the middle-eastern slope of the Rocky Mountains, where, at stations, they amounted to .08; the departures below the normal pressure did not exceed .03.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In November, 1889, the monthly ranges were greatest on the southeast coast of New England, where they exceeded 1.30, whence they decreased southward to less than .40 over southern Florida, and westward to less than .90 over Montana, from which latter-named region they increased to more than 1.20 on the extreme north Pacific coast. On the Pacific coast the ranges decreased southward to less than .40 on the coast of southern California. Along the Atlantic coast the extreme monthly ranges varied from .33 at Key West, Fla., to 1.34 at Boston, Mass.; between the eighty-second and ninety-second meridians, .64 at Cedar Keys, Fla., to 1.26 at Port Huron, Mich.; between the Mississippi River and the Rocky Mountains, .73 at Brownsville and San Antonio, Tex., to 1.13 at Saint Vincent, Minn.; in the Rocky Mountain and plateau regions, .42 at Yuma, Ariz., to .94 at Walla Walla, Wash.; on the Pacific coast, .36 at San Diego, Cal., to 1.20 at Port Angeles, Wash.

AREAS OF HIGH PRESSURE.

Seven well-defined areas of high pressure were observed within the limits of the United States during the month of November. They were generally first observed in the region north of Montana and Dakota, although two first appeared west of the Rocky Mountain regions. The general direction of movement was to the southward while passing over the eastern slope of the Rocky Mountains, and to the eastward during the transit over the eastern portion of the United States, the direction of movement becoming slightly to the

north of east as the areas approached the Atlantic coast. The average rate of movement was twenty-six miles per hour, and the deviation from this average was relatively slight, the maximum rate of movement being thirty-five miles per hour, while the minimum was only twenty-one.

The following tables exhibit some of the more prominent characteristics of the high areas:

TABLE I.

No.	First observed.			Last observed.		Duration.	Velocity per hr.	Highest pressure.			
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.	
		°	°	°	°	Days.	Miles.			Inches.	
I.....	2	50	129	35	77	5.0	26.0	5	Pueblo, Colo	30.74	
II.....	6	41	119	45	127	4.0	23.0*	9	Montrose, Colo.....	30.52	
III.....	10	52	109	28	99	2.5	35.0	11	Fort Custer, Mont	30.44	
IV.....	13	53	117	47	59	6.5	21.0	16	Washington, D. C	30.70	
V.....	21	33	101	32	79	3.0	21.0	24	Charleston, S. C.....	30.38	
VI.....	23	54	110	49	62	5.0	26.0	26	Northfield, Vt.....	30.68	
VII.....	26	55	106	38	81	4.0	30.0	27	Qu'Appelle, N. W. T....	30.96	
Mean....		48	113	39	83	4.3	26.0	....	.....	30.63	

*Moved from central Rocky Mountain regions to the north Pacific coast.

TABLE II.

Number.	Maximum abnormal rise in pressure in twelve hours.			Maximum abnormal fall in temperature in twelve hours.			Maximum wind velocity.		
	Amount.	Station.	Date.	Amount.	Station.	Date.	Miles per hour.	Direction.	Date.
	Inch.			°					
I.....	.56	Calgary, N. W. T	2	26	Swift Current, N.W.T	2	48	ne., e.	5
II.....	.16	Montrose, Colo.....	8	22	Roseburgh, Oregon .	7	36	n., s.	8, 9
III.....	.50	Denver, Colo	11	35	Shreveport, La.....	12	48	n.	11
IV.....	.50	Fort Custer, Mont...	13	20	Qu'Appelle, N. W. T.	14	40	nw.	15
V.....	.30	Nashville, Tenn.....	22	21	Rio Grande City, Tex	21	40	w.	23
VI.....	.46	Des Moines, Iowa ...	24	22	Des Moines, Iowa...	24	43	nw.	26
VII.....	.40	Qu'Appelle, N. W. T.	26	21	Des Moines, Iowa...	27	44	w.	30

The following is a brief description of the weather conditions attending the movements of each area of high pressure observed during the month:

I.—At 8 a. m. of November 2d a storm of considerable energy covered the Lake region, the barometer being unusually low over Lake Superior, while the pressure increased from the centre in all directions within the limits of the United States, indicating the presence of areas of high pressure to the east of Nova Scotia and on the north Pacific coast. The high area to the westward extended over the plateau and Rocky Mountain regions during the 3d and 4th, attended by heavy snows in Colorado and New Mexico. In New Mexico, southern Colorado, and northern Texas, the unusually low temperature and drifting snow caused loss of life and property, especially in the cattle districts. An interesting report relative to this storm has been prepared by M. A. Upson, voluntary observer at Roswell, N. Mex., which will be found under the head of "Snow," in this REVIEW. After the centre reached the upper Missouri valley the area apparently moved directly southward, reaching southern Colorado on the afternoon of the 5th, causing unusually cold weather for the season, the temperature being below 20° over the greater portion of Colorado, while it was above 50° north of Montana, and freezing in northern Texas, where heavy snow was reported on the morning of the 6th. In eastern Colorado this area moved eastward, covering the central valleys during the 6th, and the middle and south Atlantic coasts during the 7th. The northerly winds which resulted from this easterly movement over the Southern States were accompanied by heavy rains in Texas and the lower Mississippi valley, except at New Orleans, where only light showers occurred. This area disappeared to the east of North Carolina during the 7th, reports from the coast indicating that it probably changed its course to the northeast after passing to the Atlantic.

II.—Was probably central to the northwest of Nevada on the 6th. The conditions which favored its formation having extended eastward from the Pacific during the previous day. There was apparently a northeasterly movement during the succeeding twenty-four hours, which carried the centre over Idaho, after which there was a well-marked southeasterly movement during the 7th and 8th, which carried the centre to the southeastern portion of Utah, after which a retrograde movement was observed, which continued during the 9th and 10th, when the centre was on the north Pacific coast west of Oregon where this area was last observed on the morning of the 11th, and it probably joined or formed a part of that described as number iii, which approached from the region north of Montana on the 10th.

III.—On the afternoon of the 10th the barometric pressure was high on the north Pacific coast, and the isobar of 30.20 indicated either the advance of a separate area of high pressure or a re-enforcement from the northward of the area which then extended over the north Pacific coast. While the barometric pressure within the limits of this area was not unusually high, it was attended by high northerly winds, low temperatures, and heavy snows at Rocky Mountain stations during its course southward. It decreased in energy after passing southward of Colorado, but it was felt over New Mexico and the Rio Grande Valley during the 12th, and it was last observed in southern Texas on the 13th. The movement of this area over the Missouri Valley, Kansas, Nebraska, and western Iowa, and thence northward, was accompanied by a well-marked cold wave extending westward to the Rocky Mountains, the change in temperature in twenty-four hours ranging from 20° to 30° on the 11th. This volume of cold air extended southward over Texas and Louisiana, where the change in twenty-four hours on the 12th and 13th ranged from 20° to 30°, and the abnormal change in twelve hours at Shreveport was 35° on the 12th.

IV.—First appeared north of Idaho on the 13th and moved southeastward, following the general course of the Missouri Valley, until the morning of the 14th, when it was central in northern Kansas, and covered the eastern slope of the Rocky Mountains, the barometric pressure being near 30.40 from northern Texas to Manitoba. This condition extended eastward over the central valleys during the 15th and 16th, the pressure increasing during the easterly movement, and the area becoming more extended in the east and west direction along the fortieth parallel from the Atlantic coast to Colorado. During the easterly movement from Kansas to the middle Atlantic states, the pressure at the centre increased three-tenths of an inch, but after reaching the middle Atlantic coast the direction of movement became northeasterly, and the pressure declined rapidly on account of the advance of a storm from the southwestward. By the 20th this area had passed to the eastward beyond the limits of the stations of observation.

V.—This was an area of high pressure of slight intensity which apparently developed in northern Texas on the 21st. It passed southeastward to the Gulf, and thence eastward to Florida, attended by generally clear weather and no marked atmospheric disturbance. The pressure increased and the area extended during the easterly movement. Light frosts occurred in the south Atlantic states on the morning of the 24th, when the centre was near the coast line. It apparently disappeared to the east of the Atlantic coast line during the 24th, after which it probably formed a part of the high area traced as number vi.

VI.—On the morning of the 23d this area was observed far to the north of Montana. It moved southeastward with increasing energy and pressure, extending over the Northwest on the 24th and the central valleys on the 25th. It was attended by a slight cold wave over limited portions of Missouri and the Ohio Valley, but the fall in temperature was not unusual. The direction of movement changed when the centre reached the upper Mississippi valley, and the area moved directly eastward over the Lake region to the Atlantic coast,

after which it followed a northeasterly course, passing over New England on the 27th, and over the Maritime Provinces on the 28th. It was generally attended by fair weather until the advance of the storm from the southwest caused snow and rain in its west quadrants. It disappeared quickly after reaching New England, the velocity apparently increasing after the centre of greatest pressure reached the coast.

VII.—Appeared to the north of eastern Montana on the 26th, and followed the same general course to the south and eastward as described for the preceding area, only that the centre moved farther to the south, reaching Indian Territory before the easterly movement commenced. It was the most marked area of high pressure which occurred during the month, and the maximum pressure, 30.96, with a temperature of —16°, occurred at Qu'Appelle, N. W. T., on the 27th. This area was preceded by the most severe storm of the month in the Lake region, and was attended by a cold wave generally throughout the Northwest. It extended southward to the Gulf coast, and westward over the Rocky Mountain regions, but the pressure decreased at the centre, and it lost intensity after extending over the central valleys and the Atlantic coast. At the close of the month it covered the eastern portion of the United States, and was central in the upper Ohio valley.

AREAS OF LOW PRESSURE.

Eight areas of low pressure were observed within or near the limits of the United States during the month of November, although in three cases the area of disturbance divided, forming secondary disturbances which were readily traced from the regular telegraphic reports. The mean latitude of the tracks of the low areas observed is to the south of the normal track of November storms, and the direction of movement was generally to the northeast after reaching the central valleys. The region of greatest storm frequency extends from Texas northeastward to the lower lake region. Seven areas of low pressure passed over the Atlantic coast within the limits of the United States, while only two were observed in the upper Missouri valley and in the northern Rocky Mountain region, and the direction of movement of the two areas of low pressure observed in the extreme northwest was to the south of east while central to the west of the Mississippi Valley. The average rate of movement was about thirty miles per hour, while the maximum rate was fifty-two miles and the minimum fourteen.

I.—This disturbance had developed at the close of the previous month, and has been traced as number xii on chart i of the October WEATHER REVIEW. At 8 p. m. of October 31st it extended over the southwest, being central in the eastern portion of Indian Territory, from which region it moved almost directly north during the 1st and 2d of November, increasing greatly in intensity during the northerly movement, the pressure at the centre decreasing about six-tenths of an inch during its passage from Indian Territory to Lake Superior. It was attended by general rains throughout the country east of the Rocky Mountain slope, dangerous gales on the Lakes, and high winds on the New England coast. After reaching Lake Superior it apparently moved to the northeast, and although the centre of disturbance was far to the north of the Saint Lawrence Valley, its northeasterly movement was indicated by the reports from the Maritime Provinces, where strong southwesterly gales occurred on the 3d. After passing to the northeast of Lake Superior a sharp fall of temperature occurred in the upper lake region, attended by heavy snow in portions of the upper lake region and upper Mississippi valley.

II.—The telegraphic report of the 5th indicated the presence of this disturbance far to the north of Montana, while an area of high pressure covered the greater portion of the United States, extending from the Atlantic to the Pacific coasts, the centre of greatest pressure being immediately south of the area of low pressure. This storm moved directly eastward north of the United States, attended by a corresponding easterly movement of the area of high pressure to the southward. It apparently increased in energy during the easterly movement. Although it did not produce any marked change in the weather conditions within the limits of the United States, the winds attained a maximum velocity exceeding forty miles per hour in the lower lake region and in the Saint Lawrence Valley during its passage to the north of those sections.

III.—This disturbance apparently developed near the west Gulf coast, where it was central on the morning of the 7th, although the heavy rains and northerly winds in that section indicate that it may have existed over the Gulf south of Galveston previous to that date. It passed northward from Louisiana to Illinois during the twenty-four hours following its first appearance, causing general rains throughout the central valleys and thence eastward to the Atlantic coast. During the northern movement the barometric gradient became less, and during the 8th two disturbances of slight energy formed, one south of the upper Ohio valley, and one in northern Indiana. The latter disappeared during the 9th, while the former passed eastward off the middle Atlantic coast, causing moderate gales in southeast New England on the 10th. It increased in violence after leaving the coast, and passed over the north Atlantic from the 11th to the 14th, causing severe gales.

IV.—This disturbance developed over Montana during the night of the 9th, but it was preceded by an area of low pressure which was central north of Montana on the 8th and moved eastward north of the United States to the region of Lake Superior, where it disappeared apparently by increase of pressure due to the advance of an area of high pressure from the northwestward. This area of high pressure also forced the storm which was central over Montana rapidly to the southeastward, and on the afternoon of the 10th it covered Colorado and on the morning of the 11th it had passed as far south as northern Texas, attended by heavy snow, strong northerly gales, and a cold wave at central Rocky Mountain stations. The principal disturbance continued its southerly course until the centre reached southeastern Texas, but a secondary disturbance formed in the lower Missouri valley and moved northeastward to the upper lake region, where it was central on the afternoon of the 12th. The storm in Texas changed direction to the northeast and moved over the lower Mississippi valley during the 12th, attended by heavy rains. By the morning of the 13th the storm in the Lake region had united with the principal disturbance, which was then central in eastern Kentucky. During the 13th it moved eastward to the middle Atlantic coast, the pressure decreasing rapidly during the easterly movement. After the centre of disturbance passed east of the coast line the storm increased greatly in energy, and dangerous gales were reported along the Nova Scotia and Newfoundland coasts during the 14th and 15th.

V.—This storm apparently developed in the Gulf, south of New Orleans, during the 16th. Its centre reached the coast near Pensacola on the afternoon of the 16th, after which the storm divided, forming two disturbances, one of which passed northeastward, following the coast line from Georgia to Maine, and the other passed northward to the Ohio Valley and the lower lake region. Heavy rains generally occurred in the southern states east of the Mississippi during the passage of this storm over that region. High winds occurred on the south Atlantic and Gulf coasts, and the clearing weather which followed was attended by light frosts in southern Texas and along the Gulf coast as far east as Pensacola. The pressure at the centre of these disturbances decreased during the northerly movements until the storms reached the lower lake region and the middle Atlantic coast. While the area traced as number v was more clearly defined, the strong easterly gales which occurred in southeast New England on the 19th indicated that the disturbance traced as number v*a* passed off the middle Atlantic coast and thence northward along the New England coast during the night of the 19th. The maximum velocity at Block Island, R. I., during the 19th was sixty miles from the east, and on the same day the maximum velocity at

New York, N. Y., was thirty-two miles from the north. Brisk and high northeasterly winds continued on the northern New England coast during the 20th, but the storm apparently disappeared after reaching northern New England. The western branch of this disturbance, after reaching the lower lake region, apparently passed to the north of Lake Huron, and it was quickly followed by a storm from the southwest traced as number vi.

VI.—This disturbance was first observed in northern Texas in the southeast portion of a barometric trough which extended over the Rocky Mountain regions and the north Pacific coast. During the preceding day a general storm had prevailed over the Pacific coast and the north-central plateau regions, attended by heavy rains as far south as southern California, the centre of disturbance being on the north Pacific coast where the barometer was unusually low, that at Fort Canby, Wash., being 29.38 on the morning of the 19th. The pressure increased rapidly on the north Pacific coast during the night of the 19th, and the barometric trough moved eastward to the central valleys during the 20th, the disturbance over northern Texas becoming more clearly defined as it approached the lower Mississippi valley. On the morning of the 21st it was central near Cairo, Ill., and the rain area extended over the central valleys and the Lake region. A secondary disturbance formed near the south Atlantic coast on the 21st, and while the principal disturbance moved to the lower lake region and the Saint Lawrence Valley, the secondary disturbance passed along the Atlantic coast, causing strong easterly gales in southern New England on the 21st. These disturbances apparently united in the northern portion of New England on the 22d, after which this storm apparently moved northeastward beyond the stations of observation.

VII.—This is the only disturbance of the month traced to the eastward of the Rocky Mountains from the Pacific coast. On the morning of the 22d it was central over Oregon, attended by heavy rains on the coast and snow in the interior. On the afternoon of the 22d it covered the northern Rocky Mountain regions. During the 23d it passed over the Dakotas and Iowa, but the weather continued fair in the Northwest. The pressure increased at the centre of this disturbance after passing to the east of the Rocky Mountains, and it disappeared to the northeast of the upper lake region during the 24th, without causing any decided change in the weather conditions within the limits of the United States.

VIII.—Apparently developed in southern Texas on the 26th. It passed rapidly to the northeastward, causing general rains, except in the Northwest and the upper lake region, where snows were reported on the 26th, 27th, and 28th. The storm increased in violence during the northeasterly movement, and the strong gales, attended by freezing weather and snow, in the Lake region, caused much damage to shipping, although the warning signals had been displayed in advance of this storm at the lake ports. After the centre of disturbance reached the southern portion of the upper lake region, a secondary disturbance formed over the middle Atlantic states, which, however, quickly united with the principal disturbance in northern New England on the 28th. Heavy rains and severe easterly gales occurred along the New England coast as the centre of disturbance passed northeastward to the Saint Lawrence Valley, and brisk to high winds and snow continued in the lower lake region during the 29th after the centre of disturbance had passed to the northeast of the Maritime Provinces.

The following tables exhibit some of the principal facts regarding these low areas:

TABLE I.

No.	First observed.			Last observed.		Duration.	Velocity per hr.	Lowest pressure.		
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Date.	Station.	Reading.
		°	°	°	°	Days.	Miles.			Inches.
I	1	38	92	49	85	1.5	28.0	2	Port Arthur, Ont	29.32
II	5	55	109	50	57	2.0	52.0	7	Father Point, Quebec	29.58
III	7	31	93	42	85	1.5	28.0	7	Memphis, Tenn	28.82
IIIa	8	37	82	40	70	1.5	18.0	10	Nantucket, Mass	29.84
IV	10	46	112	44	62	4.0	40.0	15	Saint John's, N. F	29.13
V	16	29	89	46	79	4.5	14.0	20	Parry Sound, Ont	29.56
Va	17	32	82	46	67	4.5	14.0	19	Atlantic City, N. J	29.72
								20	Portland, Me	
VI	19	35	100	51	62	4.0	31.0	22	Chatham, N. B	29.24
VIa	21	37	72	47	66	1.0	31.0	22	Chatham, N. B	29.24
VII	22	43	117	46	83	2.0	45.0	22	Fort McKinney, Wyo	29.48
VIII	26	27	99	52	64	3.5	34.0	28	New York, N. Y	29.42
Mean	....	37	95	47	71	2.7	30.5	....	.....	29.40

TABLE II.

Number.	Maximum abnormal fall in pressure in twelve hours.			Maximum abnormal rise in temperature in twelve hours.			Maximum wind velocity.		
	Amount.	Station.	Date.	Amount.	Station.	Date.	Miles per hour.	Direction.	Date.
	Inch.			°					
I	.52	Winnipeg, Man	2	21	Sydney, C. B. I	3	48	*	2, 3
II	.46	Medicine Hat, N.W.T	5	26	Swift Current, N.W.T	4	44	w.	7
III	.30	Memphis, Tenn	7	24	Bismarck, N. Dak	8	36	†	7, 8
IIIa	.22	Halifax, N. S	9	17	Chattanooga, Tenn	8	48	ne.	10
IV	.60	Halifax, N. S	14	18	Montgomery, Ala	12	48	nw.	10
V	.30	Louisville, Ky	17	13	Knoxville, Tenn	17	36	e.	17
Va	.34	Norfolk, Va	17	15	Wilmington, N. C	17	60	e.	19
VI	.34	Abilene, Tex	19	20	Abilene, Tex	19	56	n.	20
VIa	.40	Atlantic City, N. J	21	19	Charleston, S. C	21	48	se.	21
VII	.58	Fort McKinney, Wyo	22	31	Pueblo, Colo	23	48	w.	23
VIII	.64	Albany, N. Y	28	26	Bismarck, N. Dak	25	72	ne.	28

*SW., w., and nw. †N. and nw.

NORTH ATLANTIC STORMS FOR NOVEMBER, 1889 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the depressions that appeared over the north Atlantic Ocean during November, 1889, are shown on chart i. These paths have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Eight depressions have been traced for November, 1889, the average number traced for the corresponding month of the last seven years being 10.7. The greatest number of depressions traced was fourteen, in 1887, and the least number was seven, in 1882. Of the depressions traced for the current month, five advanced eastward from the American coast between the thirty-fifth and fiftieth parallels; one apparently moved eastward from the Labrador coast; one first appeared southeast of the Banks of Newfoundland, and one is given a track from mid-ocean in high latitudes to the north of the British Isles. The depressions generally pursued east to northeast tracks, and in each instance the centre of disturbance passed north of the region of observation before reaching the European coast. The month opened with very low pressure over the British Isles, a barometer reading of 28.82 (732) being reported at Leith, Scotland, on the 1st. From this date until the 5th, and from the 24th to 27th, the pressure was generally low over the British Isles; during the remainder of the month high pressure prevailed in that region. Over mid-ocean on the 1st, 2d, 4th, and 5th fresh to strong gales prevailed along the trans-Atlantic tracks, attending the presence to the northward of areas of low pressure. On the 7th and 8th a depression moved northward east of the Grand Banks, and another depression passed eastward over northern Newfoundland, causing fresh to strong gales between the thirtieth and sixtieth meridians. On the 11th, 12th, and 13th, gales of hurricane force were encountered over and near the Banks of